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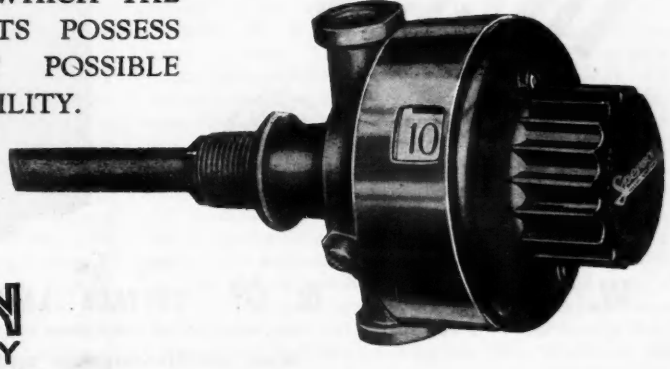

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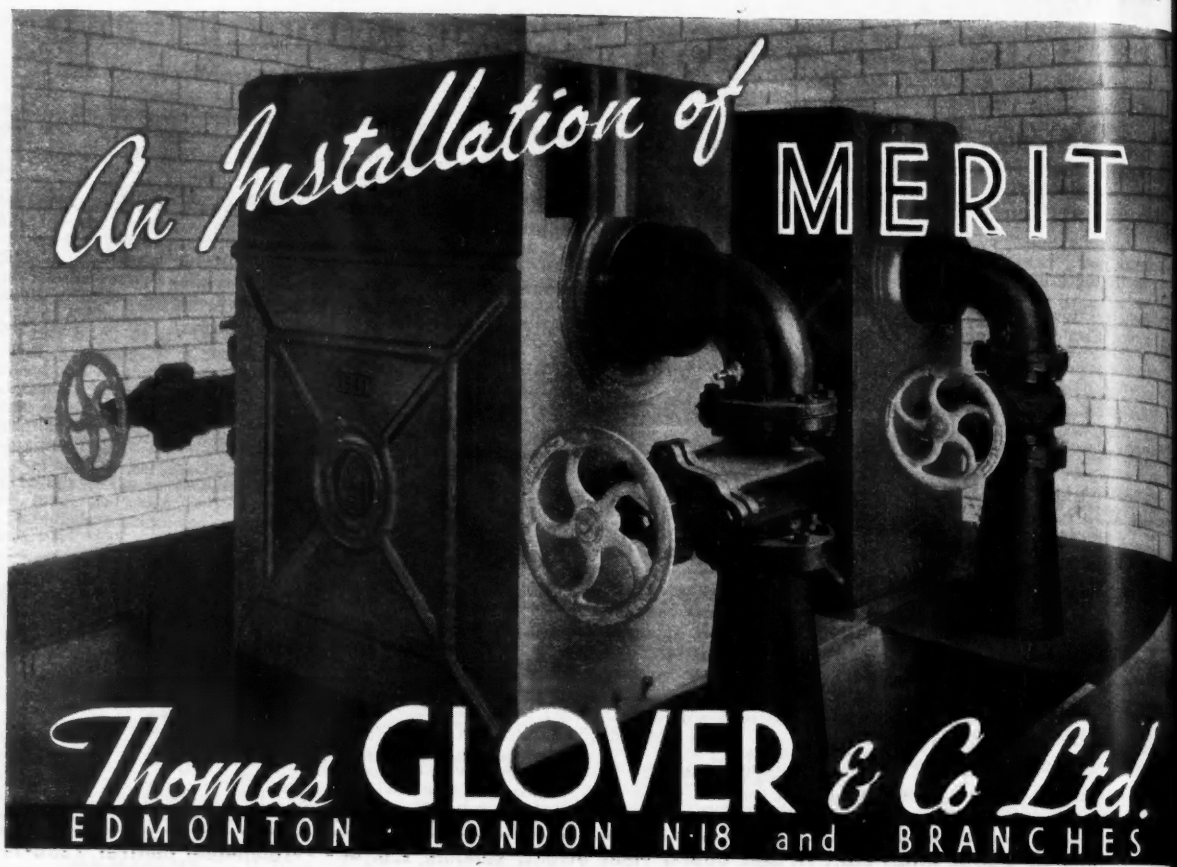

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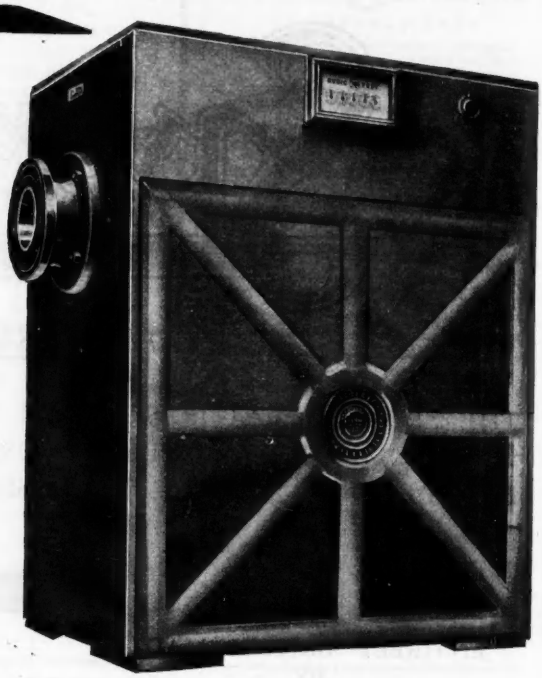

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P8

GAS JOURNAL, FEB. 6, 1946

VOL. 247 98th YEAR No. 4316

FAR BELOW TARGET

SHORTLY before the present Government came into office the then Minister of Fuel and Power, Major Lloyd George, boldly entered the lion's den and addressed the National Union of Mineworkers; we well remember his remarks to the effect that if productivity continued at its then level, the mining industry would become a drag on the economic life of the country at a time when the country's place in the world depended on the degree and rapidity of her economic recovery from the effects of war. Prior to our commenting upon Major Lloyd George's utterances we had recorded almost month by month the declining output of coal throughout the war, and it was in our issue of July 11, 1945, that we said: "Our politicians and would-be politicians have had much to say. Now let them get on with some useful work lest it be said of them that they fiddled while England burned wastefully what coal it saw fit to produce."

Labour came into power the following month, and almost immediately the new Minister of Fuel and Power appealed to the National Union of Mineworkers to increase coal output. Here again we may be forgiven for quoting what we said at the time: "Let us hope that either psychologically or catalytically the magic word 'nationalization' will spell fuller coal bunkers and fuller coal cellars." Mr. Shinwell at that time appealed for an extra 8 million tons of coal between the impending October and the end of next March. While he was speaking in August of last year, statistics were published for the coal industry for the second quarter of 1945, showing a substantial drop in output. Compared with the corresponding quarter in 1944, output figures showed a drop in mined coal of 2.4 million tons, and an increase of 1 million tons in tonnage lost. At the time we expressed the hope that, since the miners had got what they asked for politically—and the "JOURNAL" is essentially non-political—the extra 8 million tons of coal would, in fact, be raised during the ensuing six months. We turn to the latest statistics issued last month about the coal industry. They related to the five weeks ended on Dec. 29, 1945, during which period the output of mined coal was 377,200 tons below the target level. Voluntary absenteeism among coal face workers for December was 10.81%, compared with 7.93% in December, 1944.

Last week came the debate on the Coal Bill, which began in the House on Tuesday and finished on Wednesday, when the Opposition's amendment for its rejection was rejected by 359 votes to 182, and the Bill was read a second time. Mr. Shinwell was highly optimistic about the future of the coal industry provided, of course, that the Bill calling for nationalization went through and was supported wholeheartedly. He explained that the Government contemplated complete modernization of the industry, and proposed to make advances up to £150,000,000 over the first five years for capital expenditure and the provision of working capital. For the Opposition, Mr. Eden asked whether, in regard to this vast sum of money, the Chancellor of the Exchequer had related it to the needs of national insurance, the commitments in regard to the stabilization of the cost of living, or to the fact that the country had to build 5 million houses, and he queried whether the £150,000,000 had merely been thrown into the Bill as a frivolous piece of publicity. The Government, he added, had been in power for six months, and there had been no favourable reaction so far or response to the Minister's various appeals, which had succeeded each other in increasing urgency and increasing ineffectualness, and that for six months the coal industry had been drifting rudderless with the tide of decline of output. We ourselves wonder to what extent there has been a change in the psychology or feeling of the mineworker since the advent of the present Government.

It was argued that the Bill—the acid test of which was whether it would bring increased production of coal at a reasonable price—provided no protection either for the coal consumer or for the miner, and that the more industries in this country were nationalized the more political pressure there would be in the House; already the coal industry's powerful representation was out of all proportion. Again, that all the Bill did was to transfer the title deeds of 750 colliery undertakings to a State monopoly, and to place the taxpayers' money at the disposal of nine "bosses"—*i.e.*, the proposed Coal Board. There was criticism, too, of the wide powers which the Minister of Fuel seeks. He is to have the right of appointing and dismissing the Board, as well as the right to be consulted before the Board embarks on any substantial outlay of capital. The Bill, in fact, gives the Minister and the Treasury an unfettered right, without legislation or consultation with Parliament, to determine the investment and price policy of the Coal Board. If the Board takes one view and the Government another, will Mr. Shinwell override the Board?

SCARCITY OF MANTLES

IN the years immediately before the war the manufacture of gas mantles in this country had more than overtaken the demand, and it was not surprising that when war production was stepped up mantle making was stepped down. There were substantial stocks in hand, and with the suspension of all public lighting excepting a few "starlights," the demand reached abnormally low levels, and the trade enjoyed no priorities. Public lighting was partially restored last winter, the restrictions were completely lifted at the end of double summer time in July, and although for fuel economy reasons there was a reduction of lighting at the beginning of the present winter, local authorities were, and still are, planning to bring illumination up to pre-war standard. Mantle stocks were rapidly exhausted, and new demands found the manufacturers hopelessly understaffed. Enquiries came pouring in not only from this country, but for the overseas market, and the makers were eager enough to satisfy them, but found it impossible. Such orders as have been accepted are anything up to eight months in arrear, and many orders have had to be refused entirely.

It seems that the whole trouble is that the makers cannot get the labour they require. The position now, indeed, is worse in some factories than while the war continued, for numbers of part-time women workers have walked out and the factories have fewer people available than ever before. Materials are not unduly scarce, though mantle makers cannot get enough rings, the reason here again being that the ring makers are without labour. Customers who before the war took deliveries of mantles in 100 gross lots now have to be thankful to get 10 gross at a time. There are less than a dozen firms producing substantial quantities of mantles in England to-day, and only two or three firms that manufacture rings. The manufacturers have their own trade organization, the British Gas Mantle Association, whose Secretary and Acting Chairman, Mr. W. H. White, tells us that the members have the capacity, the plant, and the machinery, to meet the requirements of this country and to satisfy all export demands. All they require is more labour, particularly female labour. Mantle making is a semi-skilled job; and some training is required before new recruits can take full responsibility. Then there are the rings, thread, yarn, the cardboard boxes in which the mantles must be packed, and the containers to take the boxes. At each stage the labour shortage puts a brake on progress. Mr. White, on behalf of the Association, has been in close touch with the Ministry of

Supply, and although no marked changes have occurred yet he is hopeful that the negotiations will help to get the trade the labour it so sorely needs. On the public lighting side, the mantle makers' case is supported by the Association of Public Lighting Engineers. Even if domestic lighting has diminished, public lighting promises to expand, and a mantle famine is particularly unfortunate at a time when so many public and private undertakings are anxious to restore street lighting to its pre-war standard.

Help the Students

One of the principal functions of the District Education Committee of four members of the Southern Association of Gas Engineers and Managers (Eastern District) and four representatives of the London Juniors is to help and advise students in the southern area who may seek its guidance. Unfortunately most of the technical colleges are not yet functioning, but men returning from the Forces and new entrants to the Gas Industry are in need of their help. As Mr. G. L. Braidwood said at the Eastern District meeting last week, the Secretary of the Education Committee could easily write a circular letter to all the technical colleges in the South of England asking when they propose to start up, but they would probably reply that they would function as soon as the Industry could tell them how many students they were likely to send; and they would quite naturally ask if and when there would be any staff from the gas undertakings to give the necessary lectures. The President of the London Juniors and Mr. Braidwood, as Chairman of the Eastern District, are therefore asking their respective members to get directly into touch with their local technical colleges. This will be more effective because the local Engineer and Manager can talk personally with the Principal of the college, and can say how many students from his own and his neighbours' undertakings are likely to want to take the courses.

There is in the Gas Education booklet of the Institution of Gas Engineers a list of the technical colleges, which in all total 15 in London and about 30 outside London in the Southern area. The Secretary of the District Education Committee is Mr. R. F. Twist, of the South Metropolitan Gas Company, and he or any of the Eastern District members of the Committee (Colonel Gould, Mr. J. H. Dyde, Mr. G. H. Kenyon and Mr. Braidwood) would be grateful for the co-operation of all the members in this practical effort to get things moving on the educational front.

Personal

Mr. F. R. CUMBERLEGE has been appointed a Director of Bratt Colbran, Ltd., after over 20 years' service on the staff of the Company.

* * *

Mr. E. F. DADSON has been appointed Managing Director of the Imperial Continental Gas Association in lieu of his former office of Director and General Manager.

* * *

The Directors of the South Metropolitan Gas Company announce that Lt.-Col. F. J. BYWATER, M.C., has been elected a Director of the Company in place of the late Dr. E. F. Armstrong, F.R.S.

* * *

Mr. EDMUND BATES, Assistant Controller of sales and service at the Manchester Gas Department, has been appointed Sales and Fittings Superintendent to the Nottingham Gas Department, and took up his duties on Feb. 1.

* * *

Mr. H. R. BACKHOUSE, Joint Managing Director of Mellor, Bromley & Co., Ltd., and Director of their associated Companies—Pegson, Ltd., and Brown & Green—has been awarded the O.B.E. for special services to the Admiralty and the War Office.

* * *

Mr. J. SEATON, who prior to the war represented Falk, Stadelmann & Co., Ltd., in the Newcastle, Leeds, and Sheffield areas, has now been released from the Army and will shortly be visiting his friends in the Industry. Mr. Seaton served in the Royal Artillery—for the last four years in the Middle East, Persia, and Iraq.

* * *

The retirement is announced of Mr. E. C. EVANS, B.Sc., F.R.I.C., F.Inst.F., who for the past 20 years has directed his organizing abilities to the formation of numerous research committees. The Midland Coke Research Committee, which he founded with the late Professor R. E. Wheeler in 1926, was the first of a widespread series of investigations conducted at university centres into the problems of the iron and steel and coal and coke industries. These led, in 1929, to the formation of the Iron and Steel Industrial Research Council, and when its scope was widened during the war Mr. Evans was again largely responsible for its reorganization.

Mr. S. G. C. STOKES, Assistant Engineer and Manager of the North Cheshire and District Gas Company, has been appointed Engineer and Manager of the Wath, Bolton and Thurnscoe Gas Board. Mr. Stokes holds a First-Class Diploma of the Institution of Gas Engineers, and was awarded the Bronze Medal of the Institution and the Clayton Award of the Yorkshire Junior Gas Association for 1940.

* * *

Mr. H. E. G. WEST, Managing Director of Newton Chambers & Co., Ltd., who has just returned from a long business tour of Canada and the United States, has accepted an invitation to become President of the British Road Tar Association in succession to the late Sir David Milne-Watson. Mr. West has been associated with the work of the British Road Tar Association from its commencement, and has done much to encourage scientific research in the processing of coal-tar for road surfacing. He is a Past-President of the Association of Tar Distillers, and has taken a prominent part in many activities of the chemicals industry. He joined the firm of Newton Chambers & Co., Ltd., in 1919, direct from war service, later being appointed Commercial Manager and then General Manager of the Chemical Works. In 1941 Mr. West became Managing Director of Newton Chambers & Co., Ltd., and later of Thorncliffe Coal Distillation Ltd. He is also a Director of the National Benzole Company, Yorkshire Tar Distillers, Ltd., the Yorkshire Gas-Grid Company, Hallamshire Coal Supplies, Ltd., General Timber Supplies, Ltd., and is a member of the South Yorkshire Coal Owners' Association and of the British Sulphate of Ammonia Federation.

Letter to the Editor

Are Chimneys and Gas-Works an Anachronism?

DEAR SIR,—You Editorial comment in the "JOURNAL" of Jan. 23 (page 138) stating that "Chimneys are in fact quite an expensive way of producing draught" is provocative of thought. Many years ago when the waste heat tubular boiler was making its entry into gas-works, I felt that the waste heat boiler should oust the chimney.

A chimney costs half as much as a waste heat boiler. Thus, if instead of installing two chimneys and two waste heat boilers, three waste heat boilers and no chimney were installed, then at no extra cost we should acquire a spare boiler to facilitate cleaning and maintenance and should also be more adequately equipped to cope with peak loads. On such a basis designs and estimates were prepared, but I think there has been little or no progress made with the implied suggestion. According to the plan the cooled products from the boiler fans were evacuated *via* simple vents which terminated at the level of the roof covering. In consequence, there was no visual sign of smoke.

In former days—and I speak of many years ago—it was a commonplace for mill chimneys to give out a great deal of black smoke. In an attempt to reduce the nuisance the chimneys were made taller and taller, and this was done purely for that purpose and not for the creation of more draught. Surely gas-works in this matter of chimneys could well set a good example.

43, *Uxbridge Road*,
Hampton-on-Thames.
Jan. 30, 1946.

Yours faithfully,
H. J. TOOGOOD.

Diary

Feb. 7.—Midland Junior Gas Association: "Six Years of Production Problems, Investigations, and Results," A. E. West, Birmingham Gas Department, 6.30 p.m.

Feb. 8.—London and Southern District Junior Gas Association: "Further Distribution at Tottenham," E. O. Rose, Gas Industry House, 7 p.m.

Feb. 9.—Scottish Junior Gas Association: Joint Meeting of Eastern and Western Districts, Royal Technical College, Glasgow. Paper by Dr. Harold Hartley, Junior Vice-President, Institution of Gas Engineers, 3 p.m.

Feb. 12.—British Gas Council: Gas Industry House, 2.15 p.m.

Feb. 12.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 10 a.m.

Feb. 13.—B.G.C. Domestic Development Committee: Gas Industry House, 10.30 a.m.

Feb. 18.—London and Counties Coke Association: Finance Commitee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m. Gas Industry House.

Feb. 18.—Institute of Fuel: Joint Meeting with the Institution of Municipal and County Engineers. "Individual and District Heating Systems: Cost, Technique, and Planning," D. V. H. Smith. Institution of Mechanical Engineers, 6 p.m.

Feb. 19.—Chemical Engineering Group and Institution of Chemical Engineers: Joint Meeting, Burlington House, 5.30 p.m. "Preparation of Clean Coal for Special Purposes," Dr. E. T. Wilkins.

Feb. 21.—Solid Smokeless Fuels Federation: Executive Committee, 11.30 a.m. Grosvenor House, Park Lane.

Manchester Juniors

The first post-war dinner of the Manchester and District Junior Gas Association was held on Jan. 26 at the Engineers' Club, Manchester.

Proposing the health of Mr. Frank Cartledge, the President, Mr. D. Benson, said the office of President was a very high honour, and one to which all the junior members should aspire. Junior Associations were vital to the Gas Industry with its vast activities, rehabilitation schemes and training of personnel. Replying, Mr. Cartledge referred to the three members of the Council who, during the session, had taken up more important positions in the Industry. Mr. J. A. Speers had gone to Middlesbrough, Mr. E. B. Field to Rotherham, and Mr. E. Bates to Nottingham. He expressed his appreciation of their services, and he hoped that the other members would give of their best so that the Association would go on from strength to strength.

The toast of "Kindred Associations" was proposed by Mr. J. C. Hogg, who referred to the affiliation of Junior Associations to the Institution of Gas Engineers through the British Junior Gas Associations Joint Council. He also referred to the decision of the Manchester District Association of Gas Engineers that two members of the Junior Association should attend their Council meetings. The President of the Manchester District Association of Gas Engineers, Mr. C. H. Bamber, remarked that "Kindred Associations" extended to associations outside this country, some of which had been through trying ordeals. They all hoped that there would soon be a resumption of normal activities. He thought no Association had quite the same record as the Manchester Juniors. It had maintained its activities throughout the war by the discussion of current difficulties and schemes for mutual aid, and its virility during this period was largely due to Mr. Platt. It would appear that the Gas Industry had to be ready for great changes, and the members should take a close interest in what was happening.

Mr. A. K. Collinge proposed the toast of "The Visitors," to which Mr. H. B. Avery responded.

Conjoint Conference Annual Meeting

Presiding at the 14th annual meeting of the Conjoint Conference of Public Utility Associations, held at Gas Industry House on Jan. 30, Lord Falmouth said the report for 1945 again proved how useful and invaluable the work of the Conference had been. It was satisfactory to note that at long last the question of War Damage was being dealt with. The Government had suggested a method whereby the troublesome questions arising in this connexion might be speedily dealt with, and he was hopeful that by the end of this year the problems involved would as far as the utilities were concerned have been largely solved. Steps had been taken to ensure a free interchange of views between each of the Groups through the medium of the War Damage Committee, and it would be agreed that this was a sound policy to adopt.

The Conference in two respects had broken new ground this last year; first, they had reviewed and considered certain questions relating to income tax, and secondly, they had taken action with regard to certain matters relating to labour both in connexion with the right of the personnel of utility Civil Defence organizations to wear the Civil Defence Medal and also in connexion with the Dock Workers' (Regulation of Employment) Bill. When the schemes contemplated by this Bill materialized it would, he thought, be very necessary for the utilities to take counsel together, and thereby make sure that public utility workers were not drawn into the "dockworkers' net."

As in previous years, the coal situation had been a dominant feature. The sad story still continued—reduced output, deterioration in quality, and higher prices. In these difficult circumstances the work performed by the Conference and the Public Utilities Coal Committee had been of the highest order and the greatest value. They had been successful in obtaining a larger slice out of the fast dwindling cake. Although the output from a certain coalfield had decreased since 1940 by 18%, the tonnage of gas coal programmed for gas-works from that coalfield had increased by 40%. Again, as far as electricity was concerned, an increased consumption between 1941 and 1945 of over 3 million tons of coal was called for, and this additional coal had been forthcoming. Furthermore, there was evidence to show that the mere fact that the Utilities Coal (Joint) Committee had been established had introduced a spirit of accommodation among suppliers, who were now showing greater readiness to meet complaints and make price concessions than they were before. Nevertheless, the coal outlook remained extremely gloomy, and he could not see any prospects of material improvement during the coming year.

The Government had made it clear that some form of nationalization was to be applied as far as the gas and electricity industries were concerned. Regarding the Gas Industry it was interesting to note that the 'Heyworth Committee appointed by the Coalition Government had reported in favour of regionalization as opposed to nationalization, and that they particularly stressed the importance of competition. "Competition," the Committee said in its report, "between the fuel industries is the main stimulus towards efficiency, on which these proposals depend. This is important for the gas consumer, but it is equally important in the national interest that the other fuel industries—electricity and solid fuel in particular—should be stimulated to the maximum extent by competition from gas." Whether these two major conclusions would commend themselves to the Government was not as yet known.

As President he must not be contentious, though he would like to be. There were, however, one or two major principles to which he thought they could all adhere. The first of such principles was that whether nationalized or not, or whatever form nationalization may take, it was of the utmost importance for the utilities concerned to ensure as far as it lay within their power that in the future the consumers should receive the best and most efficient service at the lowest possible charge; secondly, that this object could only be achieved if the Government from the outset adopted the policy of the closest collaboration and consultation with the representatives of each of the utilities concerned. These consultations should cover not only the future structure of the industries, but the precise provisions of the legislation contemplated, and should have particular regard to the safeguards required for the protection of the consumer. Thirdly, the actual direction, conduct and operation of each of the services should be left in the hands of those who had spent their lives in that service.

What of the Conjoint Conference itself? He could well imagine that in the years to come, if gas and electricity were nationalized or semi-nationalized, there might be no need for that body, at any rate in its present form. He could not believe, however, that it was possible that the revolutionary changes now in contemplation could be implemented for some years to come. He felt, therefore, that they could look forward to a year which was bound to be very difficult, but which must be one of closest co-operation, for much useful work in the best interests not only of the utilities themselves but of the community they served still remained to be done.

Research at Staveley

The Staveley Coal and Iron Company, Ltd., have decided to co-ordinate all their chemical and metallurigcal research. To achieve this it has been decided to establish a Central Research Department, which will include the research activities of the subsidiary company, Bradley & Foster, Ltd., of Darlaston. The new department will be located at Staveley Works, near Chesterfield, and will be known as the Staveley-Bradley Foster Research Department. It will have as its principal object the intensification of research and development in all aspects of the manufacture of chemicals and iron and their utilization.

Dr. J. H. Hurst, D.Met., Technical Director of Bradley & Foster, Ltd., has been appointed Director of Research to the Staveley Company, and the new Department will be under his charge.

Domestic Solid Fuel Boilers

The generally accepted importance of domestic building at the present time lends interest to the revision of B.S. 758, Small Domestic Hot Water Supply Boilers for Solid Fuel, which has just been published by the British Standards Institution. The Specification, which supersedes B.S. 758, Parts 1, 2, and 3, covers the fire-pot type of solid fuel fired small boilers primarily intended for direct domestic hot water supply. It deals with the rating, fuel capacity, heating surface, fire grates, dampers, materials and construction, and in addition gives the method of testing boilers for the determination of water heating efficiency at rating and an overload test. The main differences between the requirements of the original specification and the revision are that (*a*) the latter requires an increase in the minimum fuel capacity of the smallest size boiler in order to ensure satisfactory banking, and (*b*) more stringent requirements, which include air control. It is fully appreciated that the many improvements called for in the new specification can only be brought into full operation when materials and labour are available for this purpose.

Copies of the specification are obtainable from Publications Sales Department, British Standards Institution, 28, Victoria Street, S.W. 1. Price 3s. 6d. post free.

1946 "JOURNAL" Directory

Page 24.—EASTBOURNE. C. J. B. Sawbridge, *S.*
" 26.—FARNHAM. W. H. Emery, *G.M. & S.*
" 42.—LUDLOW. Annual make 53,000,000. Annual sales 48,000,000. Price 12.4d. to 18d.
" 58.—ROTHERHAM. E. B. Field, *E. & G.M.*
" 64.—SPALDING. F. Harvey, *E.*
" 68.—TENBURY. Annual make 20,000,000. Annual sales 18,000,000. Plant WG.-H. Price 7s. 6d. to 8s. 6d. per 1,000.
" 74.—WATH-ON-DEARNE. S. G. C. Stokes, *E. & M.*
" 84.—COATBRIDGE. Gas purchased 4.41 million therms, not 441 million feet.
" 90.—LINLITHGOW. J. Macpherson, *E. & M.*
" 90.—NAIRN. P. M'Dougall, *E. & M.*
" 92.—PAISLEY. J. M. Dow, *E. & M.*

Institution Annual Meeting

The 83rd Annual General Meeting of the Institution of Gas Engineers will be held in London on June 4, 5, 6 and 7, under the Presidency of Colonel C. M. Croft.

Hotel accommodation in London continues to be heavily booked, and members are strongly advised to make their reservations without delay.

Degrees in Gas Engineering

The following Examination Results in the Department of Coal and Fuel Industries, Leeds University, are announced:

Ph.D.—D. Hebden, B.Sc., for a thesis entitled "Further Experiments on the Catalytic Synthesis of Methane from Carbon Monoxide and Hydrogen." R. E. Jones, B.Sc., Gas Research Fellow, for a thesis on "The Autoxidation of Coal." R. Long, B.Sc., for a thesis entitled "Infra-red Emission from Selective Radiators."

M.Sc.—W. O'Neil, B.Sc., for a thesis entitled "The Reactions Involved in the Catalytic Conversion of the Organic Sulphur Compounds of Town Gas into Hydrogen Sulphide." A. Taylor, B.Sc., for a thesis on the "Experimental Determination of the Factors Governing the Design of Coke Oven Regenerators."

B.Sc. Honours.—First Class: K. Summersgill.

B.Sc.—H. J. Buckley, D. A. Scholefield.

Dr. Hebden is the son of Mr. G. Hebden, Managing Director of the South Yorkshire Chemical Works, Parkgate. Dr. Long was a former pupil of Mr. H. Burton, Engineer and Manager of the Shipley Gas Department. Mr. Taylor is a member of the staff of the Woodall-Duckham Vertical Retort & Oven Co. (1920), Ltd. Mr. Summersgill and Mr. Buckley are the first holders of United Kingdom Gas Corporation Scholarships. Mr. Buckley is the son of Mr. A. E. Buckley, formerly Engineer and Manager of the Malta Gas Company.

First Permanent Houses Opened

The first two pairs of demonstration houses built from plans selected in a national competition for builders and architects, organized by the House-Building Industries' Standing Committee, were opened on Jan. 31. They were the first instalment of 27 pairs now being built in various parts of the country to demonstrate what the building and allied industries have to offer in the new smaller type of house. In their construction are concentrated the results of research work carried on steadily during the war years, research which makes for better interior planning, improved plumbing and heating, and better insulation. Attention has been given to the desires of women as expressed in numerous reports which their national organizations have produced, with the result that all the kitchens are "labour saving" and are fully fitted with essential equipment. All the bedrooms have wardrobe cupboards, and the new interior planning gives a spaciousness and airiness that was not so obvious in the pre-war house. Plumbing is all frost protected, and the methods and materials employed in the structural parts of the houses ensure good insulation.

The first two pairs have been built by Taylor Woodrow, Ltd., designed by T. P. Bennett & Son, at Hayes, Middlesex, and by George Wimpey & Co., Ltd., from plans designed by Eric Collins, at Eastcote. All the houses being built under the project are 900 sq.ft. superficial area, and have three bedrooms. It is not yet possible to say what their cost will be if produced in numbers. Research into man-site hours and costs of materials is being carried out during the actual building, and these statistics will be analysed and a report will be published.

One of each pair of houses opened on Jan. 31 is fully equipped with gas and coke appliances, comprising cooker, water heater and refrigerator in the kitchen, coke boiler, a gas-ignited coke fire in the lounge, and gas fires in the bedrooms. One of each pair has also been furnished in co-operation with the Council of Industrial Design, whose decorators have shown how attractively a house of this size can be completely furnished for a sum not exceeding £300 by utilizing furniture and furnishings shortly to be made available to the public, plus decorative but inexpensive items which can also be obtained.

The houses will remain open for public inspection for three months so that people may add their criticisms and suggestions for the benefit of a report which is to be prepared, and which will have an important bearing on the building industry's future programme. Other pairs of houses built from plans selected in the competition will be built at Manchester, Durham, Liverpool, Coventry, Norwich, Birmingham, Cardiff, Ardingly, Northwood, Hove, Plymouth, Wakefield, Stoke-on-Trent, Leicester, Chesham, Oxford, Letchworth, Hornchurch, Folkestone, Brighton, and Orpington.

Speaking at a luncheon at the Savoy Hotel after the opening ceremonies, Mr. George Tomlinson, Minister of Works, said he hoped that in all future housing development the trend would be to build up to a standard, and not down to a price.

Lord Reith, a former Minister of Works, pleaded for help for the private builder in providing homes for those who desired, and were willing to pay a reasonable price for, a better class of house than that proposed by the local authorities. Purchasers, he said, should be safeguarded against being penalized by the drop in prices likely to occur in a few years. He had every confidence in the building industry playing its part in the provision of post-war homes.

British Tar Confederation

The annual general meeting of the British Tar Confederation was held recently, and at that meeting, and at a meeting of the Executive Board held subsequently, the following were elected as Officers of the Confederation for the year 1946.

President.—Sir Walter Benton Jones, Bart., LL.D.

Honorary Treasurer.—C. E. Carey.

Chairman of the Executive Board.—A. E. Sylvester, F.C.A.

Vice-Chairman of the Executive Board.—Dr. T. Howard Butler.

The Executive Board consists of representatives nominated by each of the Association of Tar Distillers, the British Association of Coke Oven Tar Producers, and the British Gas Council, and they are as follows:

Association of Tar Distillers.—S. Billbrough, B.Sc., F.I.C., Dr. T. Howard Butler, C. E. Carey, E. Hardman, L. Hilton, J. H. Olliver, Stanley Robinson, Major A. G. Saunders, L. Shuttleworth, M.I.Chem.E., W. A. Walmsley.

British Association of Coke Oven Tar Producers.—R. Alsop, C.B.E., A. Bradbury, R. Crichton, C.B.E., W. J. Dobson, C. F. Dutton, G. A. Hebden, M.I.Mech.E., F.Inst.F., Sir Walter Benton Jones, Bart., LL.D., Captain C. F. Ward Jones, Captain T. H. Thorneycroft, A. Watson.

British Gas Council.—S. Black, D. D. Burns, Dr. E. V. Evans, O.B.E., F.I.C., A. L. Higham, A. E. Sylvester, H. E. Bloor, B.Sc., B.Eng., Colonel W. Moncrieff Carr, O.B.E., T.D., P. G. G. Moon, O.B.E.

The five last-named representatives of the British Gas Council have been nominated by the Association of Co-operative Tar Groups.

Gas Undertakings' Results

Colonial Gas Association.—Gas sold during the year ended June 30, 1945, showed an increase of 6.7% over the previous year, and sales by subsidiary undertakings increased by 3.4%. Mr. C. F. Broadhead, who succeeded the late Sir Arthur Robinson as Chairman, said in his first address to the shareholders at the annual meeting held at Melbourne that the coal situation had been acute during the year and gas supplies had been repeatedly on the verge of failure. A water gas plant with a capacity of 750,000 cu.ft. per day had been installed at Footscray to supplement the capacity of the coal carbonizing plant. A dividend of 5% was declared, and the Chairman expressed the hope that profits this year would permit of some slight increase provided there was no serious setback in the transition from war to peace.

Durham.—The City of Durham Gas Company reports that gas sales for 1945 amounted to 181,476,000 cu.ft., an increase of 6.4% on 1944, and of 31.6% on 1938. The Directors recommend final dividends making 10% for the year on Original capital, 7% on Ordinary, and 4% on Preference.

Toronto.—The 97th annual report of the Consumers' Gas Company of Toronto shows that the output of gas for the year ended Sept. 30, 1945, amounted to 7,417,492,000 cu.ft., and exceeded all previous records, being 4.54% greater than in 1944 and 35.25% higher than the output of 1939. There were 169,554 meters in use at the end of the year, an increase of 2,577 during the year. More than 15,000 meters have been added in the last five years. Revenue from gas sales amounted to $6,917,175, an increase of $274,290 over the previous year. The Company's capital shares were held at the close of the year by 4,727 shareholders, 93% of whom reside in Canada.

Dividends

Newcastle-upon-Tyne and Gateshead Gas Company.—The Directors recommend, subject to audit, the payment on Feb. 28 of final dividends for the year ended Dec. 31, 1945, at £2% less tax, on the Preference Stock, making £4% for the year; and at £2 17s. 6d.% less tax on the Ordinary Stock, making £5 7s. 6d.% for the year.

Romford Gas Company.—Final dividend on Ordinary Stock 3% actual, less tax, making 5½% for the year ended Dec. 31, payable March 1.

South Metropolitan Gas Company—The Directors announce that after providing for taxation and debenture interest the balance of profit for the year ended Dec. 31, including £4,614 brought in from 1944, is £189,973 (1944, £122,787). Subject to audit, the Directors will recommend at the annual general meeting on Feb. 27 a final dividend of 2½% on the Ordinary Stock, making 4% for the year, and leaving £4,701 to be carried forward. The distribution of 4% compares with 2% last year, and the comparative figure for the year ended Dec. 31, 1944, of £122,787, has been calculated on the same basis as the figure of £189,973 for the year ended Dec. 31, 1945, in order to arrive at a true comparison. This year the accounts are being presented in a new form, which embodies the recent recommendations of the Institute of Chartered Accountants.

Among Loans for which sanction has been received by the Plymouth City Council is one of £29,500, to be repaid in 30 years, for the laying of gas mains on the Kings Tamerton housing estate, and another of £9,000 for the laying of gas mains on the Honicknowle housing estate.

Gas Storage and the Industrial Load

By F. G. PYPER, B.A.
Sheffield and District Gas Company

IN those gas undertakings where the industrial load has been increasing during the last few years, the improved load factor over the year will have been noted with great satisfaction. A less satisfactory feature is the increasing discrepancy between the gas consumptions at the week end and those during the remainder of the week. Only in those undertakings which have been fortunate in obtaining an industrial load covering the full seven days will the difficulties of widely varying consumptions have been avoided. Under such conditions it is imperative that the gas storage available be used to the greatest advantage, and an attempt has here been made to develop a method of relating the gas storage required to certain conditions of output and load. It will be obvious that stocks of gas must be reduced during the five days Monday to Friday, and that this reduction must be made good during Saturday and Sunday. In this way the varying gas consumption will be covered by a constant gas make.

If, in Diagram I, a is the average daily gas consumption on the five days Monday to Friday, b is the average daily gas consumption on Saturday and Sunday, and x is the average day's make, which is

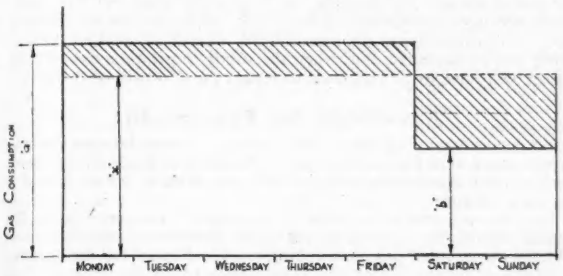


DIAGRAM I

constant over the seven days, then the two shaded areas are equal and are equivalent to the loss of stock between Monday morning and Saturday morning, and the gain of stock between Saturday morning and Monday morning.

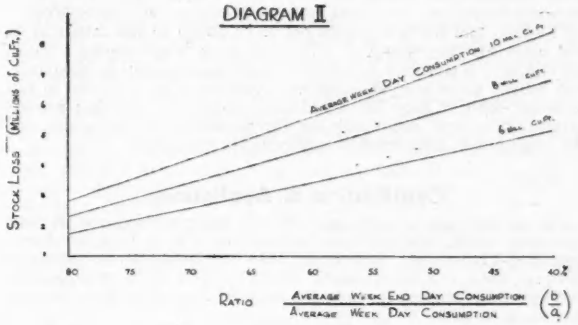
This area is $5(a - x)$ in (say) millions of cu.ft., but as $7x = 5a \times 2b$, the loss or gain in stock may be shown as $\frac{10}{7}(a - b)$ millions of cu.ft.

It will therefore be seen that the gas storage capacity required can be calculated from this, allowing such additional capacity as is considered necessary to give a safe margin both at the time of maximum stock on Monday morning, and of minimum stock, which may be during Friday evening or about noon on Saturday, according to local conditions of load, although for convenience the Saturday morning stock is taken in the calculations.

The storage required therefore will depend on the average week-day gas consumption, which is the basic factor, but will be considerably modified by the relation of the average weekend day consumption to the average working day consumption (b/a), which may be called the week-end load factor. The lower this ratio falls the greater the storage required for any given consumption.

This may be shown graphically in Diagram II, which gives examples of the stock loss that must be allowed for various consumptions with various week-end load factors. There should be no difficulty in

DIAGRAM II



substituting locally relevant figures for these given in the diagram. It shows clearly how very great is the influence of the week-end load factor on the gas storage required.

The argument has been based on the continuous operation of gas-making plant throughout the week, but it is suggested that where carburetted water gas is made the plant would normally be shut down during the week-end. For the purposes of these calculations it would then be advisable to reduce by the amount of carburetted water gas made the week-day average gas consumption.

It must be noted that only one aspect of gas storage has here been considered, that of balancing to the best advantage consumption with make. This is only one of the factors to be taken into account in deciding on a holder programme, but it may be one to which more attention could well be devoted.

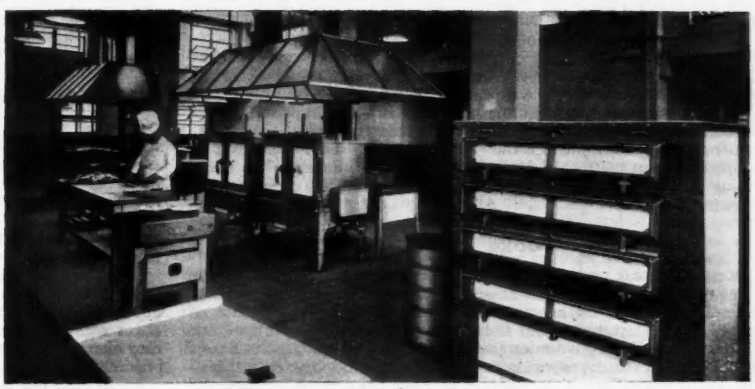
Modern Factory Canteen at Chester

Messrs. Williams & Williams, Ltd., manufacturers of metal windows, have a large modern factory on the outskirts of Chester. The concern employs some 2,600 workpeople and staff, for whom an extensive canteen has been erected, capable of seating 760 persons at a time. A special arrangement was introduced to facilitate the quick service of food and at the same time provide covered access to the canteen, which is worthy of mention. The workpeople requiring meals have to pass through a subway, and *en route* they obtain meal tickets, cutlery and trays at kiosks in a booking hall placed at the end. They then go up any of four wide staircases leading directly to the service counter, where food to their choice is provided. This is taken by them to the tables in the spacious dining room, thus avoiding any queueing and consequent delay in the dining room.

This dining room is light and airy, possesses a large stage at one end for concerts, is equipped for cinematograph projection, and is ideal for entertainment during the meal "breaks," or for dances and socials held in the evening.

The kitchen serving the canteen is well planned, and there is plenty of space for easy working. All the equipment, which includes roasting, pastry and general purpose ovens, steamers, fish frying ranges, boilers, hotclosets in service, &c., is gas-heated, and is finished in porcelain enamel.

The whole of the apparatus for the kitchen, including refrigeration, labour-saving machinery, sinks and woodwork, was supplied by Fletcher, Russell & Co., Ltd. (Radiation Ltd.). The gas apparatus was installed by the Chester United Gas Company, and Mr. G. E. Bowden, F.R.I.B.A., was the architect for the whole of the work.



The well-equipped kitchen in the canteen.

National Federation of Gas Coke Associations

Points from the Annual Report

The annual report of the National Federation of Gas Coke Associations for the period ended June 30, 1945, just issued, records that technical work was the most important function of the Federation during the year. In accordance with the recommendations in the "Report on Future Coke Development," District Technical Committees have been formed in practically all the districts, and the work of those Technical Committees is being co-ordinated by the National Technical Committee. The arrangement is for each District Technical Committee to develop its own work, having in mind local conditions, and for the National Technical Committee to co-ordinate matters of national interest. The National Technical Committee also works very closely with the Solid Smokeless Fuels Federation Technical Committee because their interests are common on a number of matters.

The "Approved Appliances Catalogue," developed by the London and Counties Coke Association in 1938, has been handed over to the National Technical Committee, who are arranging for it to be brought up to date, and for new appliances to be added to the catalogue as and when they are approved. This catalogue is not merely a list of appliances. It gives full details of each appliance and its performance, and usually there is an illustration. Appliances are included in this catalogue only if they are tested and approved. This has proved invaluable to those responsible for the installation of appliances, and the catalogue is considered an authoritative document.

Certification of Appliances

The certification of appliances is now being carried out in close co-operation with the appliance manufacturers by a National Appliances Sub-Committee. Before the Committee can certify an appliance, however, there is a large volume of testing work to be done, and the Federation is indebted to those gas undertakings which have handled this work to date.

It is considered that, in view of the potential development of new appliances, any enlargement of this work on a national scale may become too great a burden on those gas undertakings, so that it has been decided, in principle, for the Federation to have a National Coke Laboratory in the vicinity of London, designed primarily for the development and certification of appliances and work ancillary to that. It is desired to work in close co-operation with the Gas Research Board on this matter. At a later stage, laboratory facilities may be required in other parts of the country, but that is a longer term policy which it is expected will develop after experience has been gained in the laboratory now under consideration.

The Federation is represented on appropriate British Standards Institution Committees and gives that Institution every assistance, and also on various Ministry of Fuel and Power Technical Committees.

It is the declared policy of the Federation to recognize distributors as an integral part of its organization, and it is considered that the formation of Coke Distributors' Branches is the most effective way of accomplishing this. It has proved to be successful in those districts where it has been tried and other branches are now in the course of formation.

One of the functions of the Coke Distributors' Branches is to agree with the District Coke Associations margins which distributors shall receive on the sale of coke. Prior to the war there was no standard basis, but considerable thought has been given to the matter during the past year by some Associations and, in particular, by the Midland Counties Coke Association. That Association has developed a formula which has received a considerable measure of agreement from producers and distributors in the area as well as from the Ministry of Fuel and Power. Work on it is still proceeding.

An interesting development during the year is the formation by the Distributors of the National Federation of Coke Distributors' Branches. This development has been welcomed by the Federation, which has promised to support it. The objects of that organization are: (*a*) To co-operate with producers in the development and improvement of the sales of coke. (*b*) To improve the status and organization of Coke Distributors and to protect their interests. (*c*) To confer and to co-operate upon matter of national and mutual interest while maintaining complete autonomy on domestic affairs within each separate Branch area.

Coke Prices

During the year under review there was a general increase in coke prices of 7s. 6d. per ton. Increases were authorized by the Ministry of Fuel and Power on account of general increases in the price of coal to gas undertakings, but they do not take into account all the coal increases which gas undertakings have had to bear, such as substituted coals, extra transport costs, differences in quality, &c. However, the Ministry have arranged for the coke price increases to apply from the same date as the coal price increases, so that gas undertakings have not had to meet the expense of a time lag.

The present selling prices of coke are high in some areas, and that is a matter which will have to engage the attention of District Coke Associations at the appropriate time. During the year an attempt was made to regulate the price of coke breeze, and suggestions for a maximum price were put before the Ministry of Fuel and Power, but they were not accepted. A maximum price was suggested because the varying qualities and sizes of this fuel make it very difficult to fix minimum prices.

Because of war-time control of coke prices, it has not been possible to make very much headway on the arrangement of coke price structures throughout those districts in which they were not operating pre-war. This is considered to be an important matter, however, and work on it is proceeding.

The supply position throughout the country during the current year has been very difficult, and it was for that reason that the Ministry of Fuel and Power decided that arrangements must be made for distributing as equitably as possible the available tonnage. Accordingly, the Ministry appointed District Coke Representatives to undertake coke programming. District Coke Associations are assisting the District Coke Representatives in this matter.

The main reason for the continued shortage of coke is that, on account of the gas coal position, the Ministry of Fuel and Power have instructed gas undertakings to make the maximum amount of water gas. Unfortunately, in the meantime, a number of coke markets are being lost or neglected and, when the supply position is easier, much energy will have to be expended to regain the goodwill of consumers.

Advertising and Propaganda

No new publicity was undertaken during the year because the coke supply position did not justify this. There is a continued demand for the Combine Harvesting and Grain Drying booklet which is now in its third edition.

The "Report on Future Coke Development," explained in the last annual report, has been circulated to all members of the Federation and, by them, to all gas undertakings. The Report has been agreed in principle by the Governing Committees of all the District Coke Associations and, as and when it is possible, its recommendations are being implemented. As the function of the Federation is to co-ordinate the work of the District Coke Associations, it can develop only to the extent that those members make it possible. It is, therefore, gratifying to observe the progress which has been possible during the difficult 1944/45 year, particularly on technical matters.

In the opinion of the General Committee the Gas Industry will be a two-fuel Industry for many years, and coke should continue to make an important contribution to the prosperity of the Industry provided it is given due consideration as to production and utilization.

It is considered that there should be closer liaison between the gas and coke sales departments of all gas undertakings. An economic balance of gas and coke can provide comfort, convenience and efficiency to suit the requirements of all types of domestic consumers.

The new housing programme provides an opportunity for development which has never been known before, and the Federation is concerned to see that there are up-to-date and efficient coke-burning appliances for installation in the new houses, and that gas undertakings, on the other hand, appreciate their responsibilities to provide adequate and suitable coke for such purposes. To date, in all the Government demonstration houses coke appliances have had a very fair showing. The appliances which have been exhibited have not always been those which the National Technical Committee considered to be the most suitable, but there was, unfortunately, little choice at the time they were required for urgent installation. There is already an official trend towards smoke abatement which, again, places a responsibility upon coke and other solid smokeless fuels to see that this is catered for suitably.

Coke Quality and Sizing

Bearing in mind all these matters, the General Committee's policy can be summarized in brief under the three headings of production, utilization, and marketing. On production, while appreciating the many difficulties which undertakings have had to encounter during the war period, in particular, unsuitable coals, lack of materials and shortage of labour, it is considered that as soon as possible greater attention must be given to coke quality and sizing by an increasing number of undertakings.

On utilization, the Federation is co-operating very closely with appliance manufacturers, and is encouraging the development of appliances which will meet the modern trend. More efficient appliances mean more satisfied consumers and more stable markets, but they also demand more selective fuels. On marketing, the Federation is proposing to continue to work very closely in co-operation with the coke distributors and, through the Solid Smokeless Fuels Federation, with other producers making solid smokeless fuels. There are many new markets to be developed and, while this work must keep in step with fuel production, it must not be so delayed that markets are lost

Waste Heat Boilers

By W. GREGSON

A "GAS JOURNAL" Abstract of Paper No. 5 in a series presented to the Institute of Fuel on Industrial Waste Heat Recovery.

THE earliest types of waste heat boiler were applied to reject gases from steel furnaces. the gases entering the boiler at temperatures of the order of 1,200°C., at which point the conditions of heat transfer are substantially similar to those in a fuel-fired boiler. When waste gases are at temperatures of 900°C. or lower, as in the case of retort settings, contact heating becomes much more effective than radiant heating. It follows from the Stefan-Bolzmas Law, whereby radiation depends upon the difference between the fourth powers of the absolute temperatures, that with gases entering the boiler at 1,250°C. and leaving at 250°C. 70% of the evaporation is due to radiation. When the inlet temperature is reduced to 900°C., as with continuous verticals without recuperation, absorption by radiation is reduced to 24.7%, leaving 75·3% for contact transfer. At 450°C., as after recuperators with horizontal retorts, radiation is reduced to as low as 3.6%, leaving 96.4% of the work to be done by contact. In other words, in the gas-works waste heat boiler the effect is obtained by definite and intimate contact between gas molecules and heating surface.

Satisfactory contact may be realized either by passing the hot gases through tubes at such velocities that streamline flow is superseded by turbulent flow or by some mechanical method of breaking up the flow. The discovery that turbulent flow occurred above certain critical velocities was made by Prof. Osborne Reynolds and developed by Prof. Nicolson. It was applied to the recovery of waste heat by P. St.G. Kirke, and developed in the Spencer-Bonecourt and similar boilers. Mechanical means of projecting the gas stream against the tube walls are generally unsatisfactory, being liable to foul in dirty gases, but the Sinuflo boiler, later developed by Kirke, adopts a tube with a series of undulations with the object of projecting the gas molecules against the tube wall at each change of direction.

In all the boilers covered by the Paper operation is at negative pressure, the induced draught fan pulling the gases away from the settings, recuperators or furnaces with which the installation is associated. Liability to air infiltration is obvious. Cold air thus entering the system not only dilutes the gases, reducing steam output by rejecting a greater proportion of the available heat to atmosphere, but also tends to overload the fan. Flues between settings and boiler therefore demand careful study. They are generally steel-cased, with a double lining of fireclay on the hot gas face and insulating material between that and the steel plates. They should be absolutely air-tight, and all dampers should be hooded to obviate air ingress.

Auxiliary Equipment

Draught Plant.—Induced draught fans are generally steam-driven in the carbonizing industries and electrically driven in most others. General gas-works practice is to make each retort-house boiler a self-contained unit, driving its fan either by a geared steam turbine or a high-speed engine, recovering heat from the exhaust in a feed-water heater. In this arrangement about 12% of the total boiler steam is used for fan driving. An alternative method with continuous verticals is to operate the fan unit with steam passing out at, say, 25 lb. pressure discharging to the retort-steaming system.

Superheaters.—The Author's practice is to locate these in the gas intake chamber with elements in the gas-flow where the temperature of the latter does not exceed 700°C., but in the side or bottom of this chamber for radiant heat absorption at higher temperatures.

Tube Cleaning.—On the water side tubes should be kept clean by adequate water treatment. All the well-established systems are entirely satisfactory. On the gas side the tubes are kept clean by rods, fitted with brush or scraper ends, and inserted through suitably disposed holes (normally covered by plugs) in the outlet box cover plate. An air-cooled electric lamp provided within the box enables the operator to see what he is doing.

The importance of keeping the tubes clean is shown by the fact that in the case where inlet gases are at 500°C. with outlet gases at 240°C., if dirty tubes cause the outlet temperature to rise by 30°C. to 270°C. there will be a loss of 11.5% in steam output. Regular cleaning should enable a boiler to run on a carbonizing plant for 50 weeks, allowing two weeks annually for shut-down for inspection and maintenance.

Another simple method of tube cleaning used with success by the author is that of periodically tipping a bucket-full of wood-chips from a suitable hopper into the inlet box. The chips are pulled through the boiler by the draught and discharged to atmosphere, scraping the tube surfaces and scouring the fans bladed before they are charred.

Secondary Heat-absorption Surface.—Hitherto the provision of economizers has not been considered justifiable from the point of view of return on capital expenditure. The best return was obtained where gases left the boiler at about 60°C. above saturated steam temperature. But with present prices the question needs re-examination. The Author's company is considering a combination in which the load would be more evenly divided than usual between boiler and economizer. The latter would become a definite steaming unit and the boiler heating surface would be reduced. An alternative would be to fit air preheaters on the boiler discharge to preheat combustion air for the primary furnace.

Sizing of Waste Heat Boiler

Normally a waste heat boiler is designed for the highest economical gas speed in relation to fan-power. With gases entering at 900°C. a draught drop across the boiler of 3 to 5 in. is quite common. With inlet temperatures down to 450°C., 2 to 3 in. is generally acceptable. The fan must also take care of flue resistance (furnace to boiler) and dirty tubes within the limits of tube-cleaning routine. Fan power varies as the square of the draught multiplied by the flow and as the cube of the volume.

Auxiliary Firing.—Stand-by or auxiliary make-up firing is sometimes called for, in which case live gas is introduced at a suitable point in the gas flow with primary air for ignition if the waste gases are not at ignition temperatures. As there is comparatively little increase in gas weight but a big rise in temperature, care must be taken to see that the boiler is capable of dealing with the increased temperature.

Examples are given of installations of waste-heat boilers in connexion with open-hearth furnaces, soaking pits, continuous vertical and horizontal retorts. Results (given in complete tables) show that with continuous verticals, inlet boiler temperatures ranged from 730–890°C. reduced to 220–230°C. at the outlet, raising from 4.8 to 5.1 lb. of steam (equivalent from and at 212°F.) per lb. of producer fuel. The corresponding figures for horizontals were 490–500°C. inlet to 200–220°C. outlet and 2.85–3.37 lb. steam from and at 212°F. per lb. of producer fuel.

Potentialities

The Author shows that the complete equipment of the gas and steel industries with waste-heat recovery plant might result in a considerable saving of coal. Assuming 16 out of the 20 million tons of coal annually treated by the Gas Industry to be used in works large enough to justify waste-heat recovery, and that 75% of this is used in continuous verticals without recuperation and 25% in horizontals with recuperation, 9,680,000 tons of steam could be raised, saving 1,500,000 tons of solid boiler fuel. And in the steel industry, in the open hearth furnace alone, 1,100,000 tons of boiler coal could be saved out of a total annual consumption of 12 million tons of coal.

Future developments are indicated in the directions of smaller and more compact plants and of a higher yield of steam or power per unit of original furnace fuel. In gas-works power requirements are relatively low. The author takes the example of a works carbonizing 120 tons daily in continuous vertical retorts. The steam yield of a suitable boiler would be 6,500 lb. per hour of steam at 120 lb. pressure and 100°F. superheat, representing 1,300 lb. steam per ton of coal carbonized. If all this steam were used for power generation, 210 kW. would be available with potential improvement if the plant were run condensing. The Author suggests that a very considerable improvement would be obtained by the use of the gas turbine.

The Gas Turbine

We conclude this abstract by quoting the following from Major Gregson's Paper: On data recently published the Author thinks that the continuous vertical retort type of carbonizing installation offers a very attractive field to the gas turbine, as the initial waste-gas temperature—800°C. (1,472°F.) upwards—gives an ideal thermal start. Passing these gases through a heat interchanger and with an appropriate compressed air volume to absorb the heat in same for use in the turbine, a temperature of 537°C. (1,000°F.) is obtainable at the turbine, and with the latter operating on the cycle shown in fig. 1 (*i.e.*, with regeneration on the turbine exhaust to preheat the compressed air before it flows to the main heat interchanger) an electricity yield of 500 kW. should be available.

Referring to fig. 1, which is purely diagrammatic, A, B, C, and D are the turbine, compressor, electric generator and starting motor respectively; E is the main heat interchanger (taking the gases ex-settings), F_1 is the waste-gas flue from the settings, and G the induced draught fan to deal with the waste-gas flow; H is a regenerator on the turbine exhaust to utilize heat in the exhaust for preheating the compressed air before it enters the main heat interchanger E; F_2 represents make-up gas firing, for use at low carbonizing loads if it is desired to keep up full potential output on the electric generator C.

For those readers who are interested in the calculations which give this figure, the Author would refer them to the published works of Professor S. J. Davies (Davies, S. J., and Fawzi, M. I., *Engineering*, Dec. 19 and 26, 1943 ; *Proceedings of the Institute of Marine Engineers*, January, 1945). The efficiency and therefore the net output yield

from a gas turbine for a given heat input is very sensitive to higher initial temperature of the compressed air entering the turbine, and a further investigation shows that if this can be raised to 649°C. (1,200°F.) by a more efficient heat interchanger in the gas circuit ex-settings, then the electricity yield goes up to 600 kW.

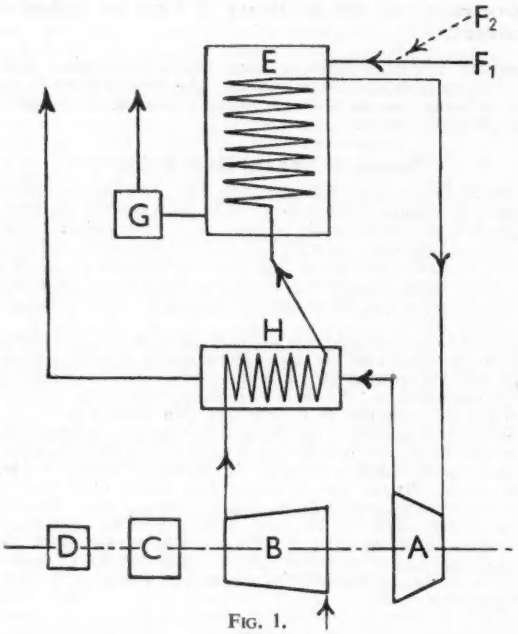


FIG. 1.

An alternative to this is to cut out the regenerator on the turbine exhaust, which under the revised conditions will reduce the electric yield to 500 kW., and by replacing the regenerator with a waste-heat boiler enable sufficient low-pressure steam to be generated therein to steam the settings, this latter figure at 20% steaming calling for—

$$\frac{.2 \times 120}{24} = 1 \text{ ton of steam per hour.}$$

Such an installation, after allowing for all the gas-works plant to be driven electrically, would result in a very appreciable residue of electricity for disposal elsewhere. Of course, the ideal application would be on large gas-works, where concentration of power load would leave a larger proportional margin of electricity for disposal outside. An important consideration is what happens at lower carbonizing loads; fortunately, the continuous vertical retort is essentially a unit piece of apparatus where the waste-gas temperature at the heat exchanger inlet remains reasonably constant, but the flow volume will be reduced. The gas turbine combination does not take kindly to lower power working without loss of efficiency, hence the idea of make-up gas firing during low carbonizing load periods (as indicated in fig. 1) has much to commend it.

New Scottish Coalfield

A new coalfield area of 75 million tons of good quality cannel coal in a two square mile section of the Laggan of Kintyre is now being exploited. This coal is of a type suitable for low temperature distillation purposes, and is of good quality, and suitable for a variety of modern chemical and fuel purposes.

The field will be worked by the Glasgow Iron and Steel Co. following trial bores some time ago. In an authoritative statement on the position, the Company states that Government approval has been given to proceed with the development, and that the work is progressing as though no complication such as nationalization existed. The area is a very large one, in two seams, of some 63,000,000 tons, and with further areas which may be worked economically in the future. From 300 to 400 employees will be engaged in the next three years in what will be the most up-to-date plants in the country. An output of 1,000 tons per day is anticipated.

The problem of finding workers for the new venture is one aspect of the position which may require some attention. There was at one time a colliery in this area, but the workers have largely died out or emigrated, so that the obvious solution must be to bring in fresh workers and to train local youths. The fact that the plant will be absolutely modern will, it is believed, assist in the recruitment of labour.

The question of utilization of the fuel is one for the Ministry of Fuel and Power, but the fact that it is suitable for distillation purposes makes it likely that it will be allocated to special processing plants.

Rates Levied in Various Towns

Mr. W. Nicholl, Borough Treasurer of Preston, Lancs, has continued the good work of his predecessors in producing the 61st annual statement of "Rates Levied in Various Towns" (1945–46). During the war years the returns were curtailed owing to the prohibition of the publication of the results of public utility undertakings, but the tables are now restored to their former scope, and besides showing the charges for gas and water supplies and average prices received for certain electricity supplies, they show profits and losses on municipal undertakings by which rates in those towns have been reduced or increased.

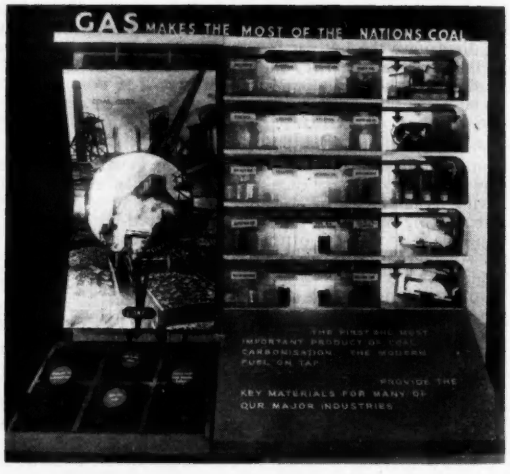
The statement is framed with the object of showing the actual rates levied and the extent to which such rates have been increased or reduced by municipal undertakings and estates. It is not intended to demonstrate the desirability or otherwise of municipal trading. The "estimated population" figures are, except in a few cases, as estimated by the Registrar-General at Midsummer, 1944, but as the population figure in evacuation and defence areas was abnormal at that time a number of figures are omitted and a question mark is substituted. There may be other areas similarly affected, such as certain of the Metropolitan Boroughs, in which attention has not been directed to the peculiar conditions.

In the majority of cases gas undertakings have neither contributed to the rates nor received any assistance from the rates. Of those which have contributed to the rates, Nottingham heads the list with £20,029, and other notable items are Salford, £10,000; Birkenhead, £3,780; Oldham, £4,000; and St. Helens, £1,000. Those undertakings which have had to call upon the rates for assistance are mainly in areas seriously affected by war conditions, notably Ramsgate, Clacton, Bexhill, and the small Shoeburyness undertaking of the Southend County Borough.

The statement also serves as a useful guide to the trend of gas prices in the municipalities, in that it gives the current domestic rates in therms and thousands cu.ft. within and outside the borough or district boundary.

By-Products Display

The application of the nation's coal resources to industry is the theme of this display unit which demonstrates the stages through which the "Treasure in Coal" passes from the raw material to the manufactured article.



The display features photographs of a coal mine and gas-works, with some of the most important chemicals released from coal by carbonization. Manufacturers who use these by-products provided an interesting selection of finished goods. The colour arrangement of buff, white, blue and yellow, with red arrows and lettering, is in contrast to the photographs and the samples of coke.

The display was designed for the Gas Light and Coke Company by Mr. T. C. Haynes, the Company's architect (Exhibitions and Displays).

We have received from the Innoxa Laboratories a brochure entitled "The Invisible Glove," describing a barrier cream which it is claimed is a valuable preventative against dermatitits. This disease is probably the commonest among industrial workers, and has been the cause of much absenteeism. The cream is prepared in eleven forms, and will keep the hands clean while in contact with many kinds of tars, creosotes, oils, paints, spirits, solvents, acids and alkalis, and numerous other substances. One application is effective for three to four hours and, since it is flesh-coloured, it can be applied to hands and face with ease and convenience.

Gas Charges—with Special Reference to Tariffs*

By ARTHUR TENNANT

General Manager, East Surrey Gas Company

GAS charges are the end and beginning of everything connected with our business. Everything leads up to the charge and everything is dependent upon the charge. Every item from the time the junior clerk sticks a postage stamp on an envelope to the time when the engineer has constructed a new retort house or gasholder has a direct bearing on the charge for gas. So, too, is the charge for gas directly related to the demand, which in turn affects production, distribution, and administration. The subject of gas charges is, therefore, an important one as it affects our every activity.

Much has been written and said on the subject of charges and tariffs in the past. Many undertakings have introduced and are operating tariffs successfully. There does appear to be the need for co-ordinating existing information and experiences in the light of the present post-war position of ever-increasing cost. One reason that tariffs have not been introduced in a good many undertakings is the uncertainty or doubt as to which kind of tariff is the best to adopt. Of the hundreds of tariffs in existence there are very few of similar structure. The need for uniformity exists, but is difficult to achieve. Very few areas have been developed on similar lines. Those districts that are described as "built-up" areas produce a greater consumption per mile of main. It is more economical to supply gas to such an area than it is to a country district where the development is very thin, covering a wider geographical area and where no industries exist. The future of the Industry is to a great extent dependent on this question of charges, particularly with reference to tariffs.

Legislation

The marketing of our commodity is the subject of very special legislation, and in considering the subject of gas charges, special attention must be paid to the legal side of the question. The principal Acts relating to the sale of gas are: the Gas-Works Clauses Acts, 1847 and 1871; Sale of Gas Acts, 1859 and 1860; Gas Regulations Act, 1920; and Gas Undertakings Act, 1934. In addition individual undertakings operate under private Acts and Orders that include provisions concerning charges for gas that are peculiar to their own areas of supply.

The early Acts were framed principally to deal with gas as an illuminant, and were not designed to legislate for the use of gas on a thermal basis. Restrictions and limitations were imposed on the undertaking with reference to price and terms for the supply of gas. These restrictions made it impossible for gas undertakings to compete with other forms of fuel. The provisions of the 1934 Act introduced greater freedom to the Industry, and enabled the undertaking, under sub-section two of section seven, to enter into special contracts, "Provided that the terms of every contract made under this section, in the like circumstances, and for the same purpose, shall be alike." This means that it is necessary to offer the same terms to both prepayment and ordinary consumers, and that the contracts must apply to all consumers in like circumstances.

As a result of this provision many undertakings have introduced new methods of charge, and have been able to devise tariffs that have enabled them to deal with competition in their own areas of supply.

Representations have been made to the Government of the day for permission for the Gas Industry to introduce a "minimum charge." Gas undertakings are under an obligation to provide a gas supply within limits, without any obligation on the part of the consumer to consume sufficient gas to pay his fair share of the expenses incurred in providing the supply, or alternatively a "minimum charge." Legislation has been granted to the electrical industry to refuse to supply an unremunerative consumer or to insist on a minimum charge. Water undertakings and the telephone services are empowered to make minimum charges. The Gas Industry, however, has been denied this right, and in consequence every undertaking has a number of consumers who make a convenience of the gas supply by consuming only a small quantity, insufficient to pay the cost of the service.

Methods of Charge

The earliest records of gas sales were before the invention of the gas meter, when gas was sold by contract according to the size of the burners and the hours of lighting. This system was very unsatisfactory because, in spite of visits by the inspector from the gas proprietor, consumers invariably used more gas and for longer hours than were provided for in the contract. The only use for gas in those days was for lighting. Gas for public lighting has always been sold by contract. Even in recent days gas has been sold by contract to domestic consumers in cases where appliances with fixed consumptions have been installed at an all-in charge. The appliances are connected directly to the service pipe, and the gas does not pass through the meter. Such apparatus as the gas refrigerator and the small consumption continuous burning storage water heater have been installed at a quarterly all-in rate, including the hire of the apparatus, maintenance and gas.

The wet meter was invented early in the 19th century, and this was succeeded by the dry meter a few years later. It was not until about 1890 that the prepayment meter was invented. All meters record the consumption in cu.ft. The need exists for meters that will register in therms. There are several Acts of Parliament relating to the measurement of gas, the principal one being the Sale of Gas Act, 1859.

The Flat Rate

For practically a century after the invention of the gas meter gas was sold at a flat rate, that is, at one price for any quantity that is used for any purpose. This method of charge is still the principal one, because until a few years ago it was the only legal method. This system produces inequalities as between one consumer and another, and has been described as inequitable as supplying gas too cheaply to small consumers. The cost to manufacture gas is the same for all consumers, but the cost to distribute it varies according to the quantity and manner in which it is taken. Generally speaking it is more economical to supply a large consumer than it is a small one. Under these circumstances the large consumer is paying more than his share of distribution and overhead costs to the advantage of the small consumer. The flat rate provides for an average charge, and no provision is made for those above or below average. Strictly speaking, those below average should pay more than the average, and those above the average should pay less. For this reason the flat rate does not offer any encouragement for the development of sales above the average.

Special discounts have been allowed for large consumptions and for gas used for gas engines. As the discounts were very limited and applied only to the largest consumers, little incentive was provided for additional business.

In dealing with the "*published price*" the Gas Undertakings Act, 1934, Section 6, Sub-section 3, paragraph (*a*) says: "The price charged by the undertakers for gas supplied to any premises otherwise than under a special contract shall not differ from the published price, and no discount shall be allowed from that price, except such discount, if any, as the undertakers allow for prompt payment."

Discounts must apply to all consumers who consume gas in like circumstances. A discount that is applied to all consumers is equivalent to a reduction in the price of gas.

Block Rate

The block rate consists of a number of quantity blocks that increase as the rate per therm decreases. In effect it is a form of increasing discounts for quantity. Such a system can be introduced only when a reduction in price can be contemplated, as the tariff must be made to apply to all consumers in like circumstances. The block rate is used chiefly in developing the industrial load. Block rates are used extensively for introducing special charges for gas that is used for specific purposes, such as central heating, large scale catering, bread baking, fish frying, &c. The advantage of a block rate tariff is the variety that can be introduced into its structure. It can consist of any number of blocks, although it usually varies from two to eight, and the size and price can be varied to suit any conditions. It is easy to understand. Before the introduction of a block rate it is necessary to ascertain from rental records what effect the proposed tariff will have on the revenue. Having ascertained the amount of consumption in each of the proposed blocks, it is a simple calculation to determine the price for each block. Some undertakings are operating successfully a block rate tariff for domestic consumers, but to be effective it means a large reduction in revenue to commence with as it must apply to all consumers.

A few undertakings have introduced what is called a "standard requirement" into the domestic block rate tariff by establishing the fact that the larger the house the greater the consumption, and the tariff is based on various sized blocks, increasing with the size of the house. This gives the smaller consumer an equal chance to benefit under the tariff, because the "block" for the house with the small number of, say, four rooms is smaller than the block for the house with 12 rooms. In order to encourage the increased use of gas in the summer, the size of the blocks is reduced during the summer months, while the gas rate remains the same.

The electrical industry, by virtue of their statutory powers to levy a minimum charge, are able to conceal a standing charge in the first block. This is really a two-part tariff, but has the psychological effect of overcoming the consumers' objection to paying a standing charge without getting anything for it. This system has the effect of increasing the price to the small consumer, who is unable to benefit from the subsequent blocks at the reduced rate.

* Paper presented to the Southern Association of Gas Engineers and Managers (Eastern District), Jan. 29.

The most scientific method of selling gas is by means of a multi-part tariff, because it evaluates the cost to supply with the charge to the consumer. The factors comprising the cost can be reduced to two, namely the cost to produce the commodity and the cost to "deliver the goods." All other factors are related to these two main items, and can be reckoned as part of them. The multi-part tariff can therefore be reduced to a two-part tariff and can be made to apply to varying types of consumers. The domestic two-part tariff is the most important one, because the domestic consumer can be said to consume about two-thirds of the total quantity of gas used throughout the country. Apart from the domestic load the two-part tariff can be made to apply to the commercial and the industrial consumer. In these two categories the cost to supply varies according to the "demand."

A two-part tariff must be promotional of gas sales and should be optional. When a two-part tariff is first introduced it is only those consumers who would benefit from it that are likely to adopt it. The presentation of the tariff should be made, therefore, in a manner that is best suited to the requirements of the undertaking. It may be used as a defensive weapon to meet competition, or it may be applied in an intensive manner to increase consumption quickly to compensate for any loss of revenue that might occur unless the tariff became effective immediately.

Consumers may be divided into three classes, the domestic, the commercial, and the industrial. Each class has a special "demand." In considering the revision of charges with particular reference to tariffs these separate classes of consumer should be treated according to the special circumstances that govern their supply.

Classes of Consumers

The domestic consumer is divided into two classes, the ordinary and the prepayment. The ordinary consumer requirements provide a greater scope for development, firstly because his demand is greater, and secondly because he is able better to meet the charges for gas consumed. He more readily appreciates and is likely to avail himself of the labour-saving and convenient facilities that are afforded by the increased use of gas. The ordinary consumer, therefore, is more likely to accept the advantages that are offered by a promotional tariff.

The prepayment consumer represents numerically the greater number of consumers in the domestic class, and this ratio is likely to increase. Special charges for gas must necessarily be considered from this point of view. Any domestic tariff that is available to ordinary consumers must apply in like fashion to prepayment consumers, but it is, of course, permissible to add to the charge made to prepayment consumers the appropriate hire charges for the prepayment installation comprising the meter and appliances as provided for by the differential charge. The differential charge in a two-part tariff can be included in the standing charge or may be added to the commodity charge. As it is an advantage under a two-part tariff to quote the same price for gas to all domestic consumers, it is recommended that the differential charge be included in the standing charge. The collection of the standing charge from the prepayment consumer can be made by the prepayment collector at his periodical visits; can be made by means of rebate from the meter; by attaching a money-box to the meter, or by arrangement with the property owner who collects the standing charge with other rental charges on the property. The standing charge to prepayment consumers should be quoted as so much per week and not as a quarterly charge.

The commercial consumer can be defined as the consumer who uses gas in connexion with his business, and comprises shops, offices, hotels, catering establishments, churches, &c. Each business must be treated on its own merits, and the charge devised to suit the particular trade. It can be in the form of a block rate or a two-part tariff. In the case of a two-part tariff the standing charge is often based on the connected load or maximum demand. The load factor of some commercial users is worth cultivating, as the gas is often consumed at off peak periods.

The Industrial Consumer

During the war the industrial load increased enormously in those areas that are scheduled as industrial. Some undertakings are fortunate in having the industrial area situated near the gas-works. The cost to supply these industries is much less compared with the smaller consumer on the fringe of the district. If, however, the industrial consumer is located some distance from the gas-works the cost to deliver the gas may be high. It must be borne in mind that the value of the industrial consumer to the undertaking is great, as he is responsible for attracting a large number of small domestic consumers to the district. The industrial load is usually a good one, because the consumption is fairly continuous and takes place at times of least demand.

Gas is sold to the industrial customer in competition, but is often preferred because of its availability on tap and the degree of heat control. It is not so difficult to calculate the cost to supply the large consumer as the quantity and conditions are known factors. The terms of a special contract to the large industrial consumer can be justified under Section 7 of the 1934 Act because the circumstances and purpose for which gas is used are peculiar to that one consumer. The industrial consumer should pay his fair share of the costs, and should not be supplied at an uneconomic rate lest it is said that other consumers are being penalized in consequence. The danger of the large industrial consumer is the time when he ceases to be a consumer, and the costs to supply him are automatically levied on the remaining consumers. It is an example of "putting all your eggs in one basket."

Load Building

In considering the question of domestic load building we commence with the assumption that gas is being used for cooking purposes. The cooking load is usually the peak load, especially at week-ends. It is therefore desirable to develop sales in such a manner as to distribute gas more evenly throughout the day. This would enable us to sell more gas to our existing consumers without increasing the manufacturing or distribution costs. In dealing with this it is necessary to study two things, "load factor" and "diversity." These terms are better known in connexion with the generation and transmission of electricity. As electricity cannot be stored it is necessary to regulate the "demand" according to the capacity of the generating and distributing plant, otherwise a breakdown occurs in the system. The introduction of tariffs in the electrical industry has done much to create demand at off peak times, and so lessen the average cost to supply. There are cases, however, of indiscriminate load building which have created peak loads above the maximum power to supply. The additional cost to meet this demand above the maximum is out of proportion to the revenue that is obtained from the additional business.

Load factor is described as the actual consumption divided by the consumption which would have occurred had the maximum gas been taken all the time. It can relate to manufacture and distribution, and can be calculated on an hourly, daily or annual basis. It enables you to ascertain what the relation is between the quantities of gas actually supplied to your consumers and the maximum quantity that could have been supplied over the same period.

Diversity is the total of the consumers' maximum demand divided by the actual total maximum demand. If mains are laid to cope with the total maximum demand of all consumers on the main, and provided those consumers do not use gas at the same time and at the maximum rate, the total of their combined maximum consumptions at the period of the peak load would, as compared with the total maximum demand, show a difference known as diversity.

These two factors tell you the difference between the actual and maximum quantities that can be delivered to your consumers at a cost of very little more than the cost to deliver the actual quantity. They also indicate the lines on which load building should be developed. A survey of the district should be carried out to ascertain the best method of doing this. The displacement of solid fuel offers good scope for load building. The water-heating load is one that should be developed, particularly in the summer months, and the space-heating load for the winter months. In this way it should be possible to create a fairly even load all the year round.

Conclusions

The foregoing notes have been prepared with the object of explaining the need for a revision in gas charges. The subject has been dealt with in a general manner, and for this reason statistics have been avoided.

The following conclusions are put forward as the personal views of the Author concerning the future structure of gas charges under the headings of the various types of consumer:

For the domestic consumer an optional two-part tariff with a low commodity charge and a standing charge, which should be paid in advance and include the rent of the meter, based on the superficial floor area of the building. For the commercial consumer a two-part tariff with a standing charge based on the connected load and for the industrial consumer a block rate.

It was in November, 1938, that the Directors of Associated Gas and Water Undertakings, Ltd., appointed a Committee under the Chairmanship of the late Mr. A. E. Logsdon to report on the subject of "Methods of selling gas in relation to sales promotion having special regard to two-part tariffs." The war interrupted the work of the Committee and no final recommendations were made. The Author of this Paper was privileged to serve on the Committee, and expresses his thanks to his Chairman, Mr. W. H. Bennett, and Directors for permission to read this Paper and for the facilities given to study the subject.

DISCUSSION

The **Chairman,** Mr. G. L. Braidwood, after congratulating Mr. Tennant on his recent promotion to the General Managership of the East Surrey Gas Company, said that in the matter of gas charges the first essential factor, as Mr. Sylvester had pointed out in an Address last year, was that the price of the commodity should be related as closely as possible to its cost. That involved an extremely careful investigation into the cost of supplying gas to consumers, including overheads, the effect of that supply on the manufacturing and the distribution load, on both an hourly and a seasonal basis, and finally the service charge. In short it involved a very detailed research which was beyond the capacity of many of the smaller undertakings. It was also generally agreed that the introduction of tariffs involved

a considerable amount of risk, and that again was a thing that many of the smaller undertakings could not face. The question of tariffs should have been attacked by the Industry as a whole long ago, and it had so far only been approached by individual undertakings. The only co-operative effort of which he was aware consisted in the recommendations by the Committee on Gas Charges set up by the National Gas Council in 1925 with regard to the allocation of costs between service and commodity. The Industry had not been in the position to carry out the research simply because the necessary statistics had never been available. The main consideration was that a tariff should be simple and readily understood by the public, and he must confess that in the case of one or two Papers he had heard on the question of tariffs he had had a feeling that the method of charge was rather over complicated. The greatest opportunity before the Gas Industry was for water heating and background heating.

The Unprofitable Consumer

Mr. **Everard** (Gas Light and Coke Company) said that in dealing with the matter of tariffs they had first of all to look at the costs of supplying various loads and base the charges on those costs. In the end the method of charge was in fact a block rate, not a complicated one of eight or more blocks as suggested by the Author, but a block rate according to the cost of manufacture and distribution of the gas. They had to bear in mind the cost of administering the undertaking, of providing free service to the consumer, and finally the cost of collection. He would separate the cost of collection from the rest of the costs, because it seemed to him on analysing the results of certain undertakings that one of the big difficulties was the small consumer who did not use much gas, and was charged too little. He led them into expenses for which they did not get a proper revenue. The first thing was to get the total cost of supplying the gas consumed and the cost of collecting the money, and that applied to every consumer. Those costs were incurred initially, and should be recovered in the shortest possible time. There were the general service costs, and it was customary in the Industry to give free service to the domestic consumer and to certain classes of commercial consumer who were charged for their gas at a flat rate, and to that extent it cost more to supply them than it did to supply the large industrial consumer.

The Author had suggested that the two-part tariff was the proper method for the domestic consumer and the block rate for the industrial consumer, but in his own personal view he thought they should be put the other way round. They were dealing with a vast number of individual private consumers in shops, offices, houses, and the like, from whom, if the two-part tariff was the only method of affording cheap gas, they had to get a vast number of special contracts. Quite a number of people in that category were shy of signing on the dotted line, and would go on paying for gas on the flat rate because they did not like to commit themselves to saying they would pay so much per month or quarter, though he had a feeling that once people acquired the "taste" of cheap gas they would pursue it. They had to take into consideration the fact that the domestic load and the commercial load varied very much in their characteristics. In some instances the commercial load in the winter was double that of the summer period, while the domestic load was not much more than 20% higher in the winter than in the summer. The larger domestic consumer tended to take all his additional gas in the winter, and where he had a two-part tariff he obtained the additional gas for space heating at a very low cost. Such a consumer increased the peak difficulties without increasing the domestic load factor to any substantial extent. The block rate encouraged consumptions at the lower stages. The two-part rate if based on the rateable value of the property did give advantages to the small consumer, but it had in the past shown signs of developing the load at the wrong time, for the reason that the consumer could only reach the consumption necessary to get the advantage of the rate by using large amounts for space heating.

A Domestic Block Rate

On the other hand, some large industrial consumptions tended to fall at different times of the year, and if they were on a block rate and their consumption fell right away the undertaking had no recompense. It seemed to him that in dealing with the large consumers there was a great deal to be said for the two-part tariff, so that they could insist on a standing charge which would tide over the times when gas consumption varied beyond the limits they had set in working out the tariff. Otherwise they had all their eggs in one basket, and even if they did not fall out some of them might be awfully bad. For those reasons, therefore, he advocated a block rate for developing the domestic load, and a two-part tariff for the industrial load. So far as the two-part rate was concerned, the Author had said the rate should be optional. It must, in his view, be optional, because they could not insist on people paying the standing charge. With regard to the "standard requirement" tariff, he had looked into the case of one undertaking which followed that principle on a very large scale, and he considered that the amount of clerical work involved in checking up to a considerable extent outweighed the advantages.

Mr. **Tennant** replied that the block rate for the domestic consumer and the two-part rate for the industrial consumer was operating at Newcastle very successfully. His object in suggesting the two-part rate for the domestic consumer was that it was optional. If they introduced a block rate for the domestic consumer they had to apply it to everybody, and must therefore budget for a considerable temporary decrease in revenue.

Mr. **A. F. Layton** (South Metropolitan) said the two-part tariff was introduced in his Company about eight years ago, and it had been of great advantage. They had found one, two, and three families living in ten-roomed houses, and it was not easy to say what proportion of some of the premises was being supplied with gas. They made very exhaustive inquiries and prepared statistics, and they found there was a definite relationship between the demands likely to be made in premises consisting of up to 20 rooms. The immediate loss of revenue resulting from the introduction of a tariff was not to be taken too seriously. There was always a disinclination to sign on the dotted line. During the past eight years they had had a series of evacuations and other movements, but through comparatively few basic rates they had been able to establish a standing charge that was reasonable for any type of business they were likely to come across. The Author had said that in the domestic field the ordinary consumer was the more likely to seize on the tariff. In South London they had found it the reverse. The prepayment consumer was keen on taking advantage of the tariff, and found he had a longer run for his penny or his shilling.

New Housing Estates

Mr. **L. C. S. Poulter** (Gas Light and Coke Company) said he liked the block rate generally for the domestic consumer, but he still had a very keen appreciation of the sales value of the two-part tariff. There was no question that the electricity industry had done a great deal to popularize the two-part tariff. It was thoroughly well understood, very much more so than the block rate, and from the commercial angle it was a very big pull. In dealing with the new housing estates he would advocate the block rate for scattered domestic consumptions, and the two-part rate for those authorities which were usually willing to collect the standing charges. When paid in that way, the tenants forgot the standing charge and thought they were getting their gas extraordinarily cheaply. There was a great deal to be said for both systems.

Mr. **C. F. Botley** said it was interesting to note that the conclusions which Mr. Tennant had reached in his Paper were very much the same as those reached by the Industry 20 years ago. In meeting competition in small towns and in developing new sales policy the two-part tariff was a very powerful weapon. His own objection to the block rate was that he had not yet seen one which offered sufficient inducement to increase the consumption of gas. Generally speaking, it seemed to him that by the time they came to the third block there must be a very considerable consumption, and the terms were not sufficiently advantageous to attract further consumption. On the question of diversity, he believed that Mr. Sylvester had given some valuable information in his Address last year, from which he gathered that while there was an extreme difference of only 10% in manufacturing costs, the other costs varied immensely, and he had taken the view that the domestic load could be met by a two-part tariff or a block rate. If a block rate was introduced, must there be one block rate for one area?

Mr. **Tennant** replied that if they introduced a block rate it must apply to all consumers under the equality clause of the 1934 Act. If they took any section of their consumers, such as the domestic, and introduced a block rate, that rate must apply to all domestic consumers.

Replying to a question from Mr. Botley as to whether the Gas Light and Coke Company had not a number of block rates, Mr. **Everard** explained that there were different rates appropriate to different consumers, but all consumers within each group were entitled to the same terms, such as all bakers, all fish fryers, and so on.

Mr. **A. Wells** (Herne Bay) said it seemed to him that it would be very difficult to introduce these special tariffs at the present time. There was the question of integration, and all sorts of things were happening in that direction.

Plea for a Gas Unit

Mr. **G. S. Wareham** (Herne Bay and Broadstairs) said there seemed to be a good deal of contradiction about the basis for the standing charge. They might get a tenant of a four-roomed house using gas for cooking and water heating, and a tenant of a 12-roomed house using exactly the same amount of gas for the same purposes. Another point he would like to raise was the question of devising a unit charge which would enable consumers to compare gas charges with those for electricity. It would be of great advantage to have a block rate expressed in comparable terms, employing a gas unit of between 4,000 and 5,000 B.Th.U. for comparison with the electrical unit.

Mr. **A. Ridley** (South Metropolitan Gas Company) said one of the difficulties in South London was that there was no consistency as between the various Borough Councils on the question of rating and valuation. Some had high charges and low assessments and others

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were the reverse. One difficulty in connexion with the block rate was the irregularity with which they collected their slot meters or checked their ordinary meter readings. For the prepayment consumer it might be a long time before he could get any benefit, and therefore it would be a long time before he would use gas more freely. In the case of ordinary consumers there were intervals up to four or five months between meter readings. While agreeing in principle with the suggested comparable gas unit of 4,000–5,000 B.Th.U., he suggested that there was already enough bewilderment through turning cu.ft. into therms.

Mr. **Tennant** pointed out that he had intentionally omitted any reference to rateable value, and had suggested that the standing charge should be based on the superficial floor area of the building.

Mr. **Ridley** said they had tried rateable value, and dropped it, because it penalized the consumer occupying a large house. He mentioned a case where a man was living in a 14-roomed house, but generally speaking was only using the bedrooms.

Mr. **Layton** said the custom in South London now was to count the number of rooms. It was much simpler than taking the superficial floor area, and the figure could easily be challenged by the consumer.

Electricity Charges

Mr. **J. H. Dyde** (Uxbridge) said several committees of the most influential men in the Gas Industry had sat upon this subject and had had many headaches without producing anything very definite in the form of a tariff. In approaching the question of tariffs it was essential that they should be related to costs. The first block would include the cost of gas manufacture, the cost of general administration, and the cost of free service to the consumer. Capital charges should be included in administration, as also should the cost of distribution and the cost of collection. What items of cost in their balance-sheet could they begin to drop progressively with increased consumption? The first would be the cost of collection, and then administration and free service. What was the final block to be? Had each therm that was manufactured got to bear the full capital cost of plant, and had it also got to carry the full cost of distribution? They usually put in mains capable of taking a peak load, and that load with certain exceptions, was the Sunday midday cooking load. There was a vast range between that and the average load. The distribution cost for one of the companies with which he was connected was not less than 1.476d. per therm, and in the case of a large rural area it was 1.7d. per therm.

One other matter was their competitive position in relation to electricity. He felt they would do the Industry a greater service than any of the promotional tariffs they were talking about if they could get the injustice in the matter of electricity charges rectified. His Company had produced a pamphlet entitled "The Public Well Served," and it pointed out that the average price per unit for domestic consumption, taking into consideration the two-part tariff, was 1.35d. per unit. It went on to say that 20,000 people representing the poorer classes of the community were taking a supply through their slot meters and were obtaining their electricity at 1.16d. a unit. On the other hand, the gas-works, consuming over a quarter of a million units, had to pay 1.497d. per unit, or 50% more than the small consumer. That was not right. Nothing could justify the fact that an electricity undertaking could charge sixpence a unit merely because a consumer wished to use electricity for lighting. Until such matters were rectified they would not do too well.

Mr. **C. A. Deas** (Tottenham Gas Company, Southgate) said that at New Southgate they obtained their electricity supply for the works, on the limited supply scale, at 0.8d. per unit, and on the unlimited supply scale at rather less than that.

Mr. **Dyde** agreed that there were variations; he understood that at Swindon Mr. C. H. Chester was paying something under a halfpenny a unit.

Answering a question as to the introduction of teriffs after irregular meter readings or collections, Mr. **Everard** said it was a simple matter to calculate the consumptions. Instead of taking, for instance, 26 therms per quarter, it was a simple matter to regard the consumption as two therms per week, and to fix a tariff accordingly.

Nobody Cares

Mr. **J. W. Townsend** (Tunbridge Wells) mentioned a difficulty that had arisen where the standing charge for fish fryers was based on the number of pans in use. The fish fryers either refused to put in larger ranges, or refused the tariff altogether. Regarding Mr. Dyde's reference to electricity, he did not think there was much hope of getting matters put right, and so long as the electricity supply undertaking in any area did not actually make a loss, nobody was going to worry whether the gas undertaking paid more than the prepayment consumer. On one or two small housing estates in his area prepayment consumers were paying a halfpenny a unit for current and a standing charge of 12½% of the rateable value of the property. The Town Council supplied the electricity and fixed the rates.

Mr. **H. J. Randall** (Yorktown, Camberley) said his undertaking sold electricity as well as gas. They paid the Central Electricity Board 0.52d. per unit for their bulk supplies of several million units a year, and they had to bear line losses and transformer losses. How people could get electricity at some of the prices quoted was a matter that staggered him.

Mr. **F. Dawson** (North Middlesex) said his Company was considering very seriously the question of introducing some system whereby it could produce statistics which would enable it to ascertain where consumption was taking place, the type of consumer, whether consumption was increasing or decreasing and so on. A difficulty they came up against was to define particular consumptions, whether domestic, commercial, or industrial. Unless they could obtain up-to-date facts all talk about tariffs was a snare and a delusion, because they could not follow exactly what was taking place. His reason for speaking was to ask whether anyone in the Association had yet classified consumers satisfactorily.

Mr. **Everard** said a complete classification had been drawn up by the Ministry of Fuel and Power.

Mr. **Tennant** said some attempt had also been made at classification in the Heyworth Committee Report.

Mr. **W. A. Howie,** President of the main Association, in proposing a vote of thanks to the Author, related how, many years ago, the prepayment meters in his area were set to supply gas at double price, so that for every shilling put into the meter the housewife received a rebate of sixpence on collecting day. So popular was the arrangement that on one occasion a consumer sent a note to the works: "Please send the collector round; we want the money out of the meter to put on the Derby."

Mr. **Botley** seconded the vote of thanks, which was carried with acclamation.

Peterborough Gas Company has closed the showroom in Westgate, Peterborough, and opened new and more modern showrooms in Church Street.

The following recently issued British Standard Specification may be obtained on application to the Secretary, the Institution of Gas Engineers, 1, Grosvenor Place, London, S.W. 1. B.S. 230 : 1945, Visual Type Portable Photometers, price 2s.

A Series of Cookery Demonstration Lectures, arranged by Alfred Bird and Sons, Ltd., Birmingham, in conjunction with the Burnley Gas Department, was opened by the Mayoress of Burnley in the Gas Showrooms on Jan. 29. Miss J. Braithwaite is the lecturer and demonstrator.

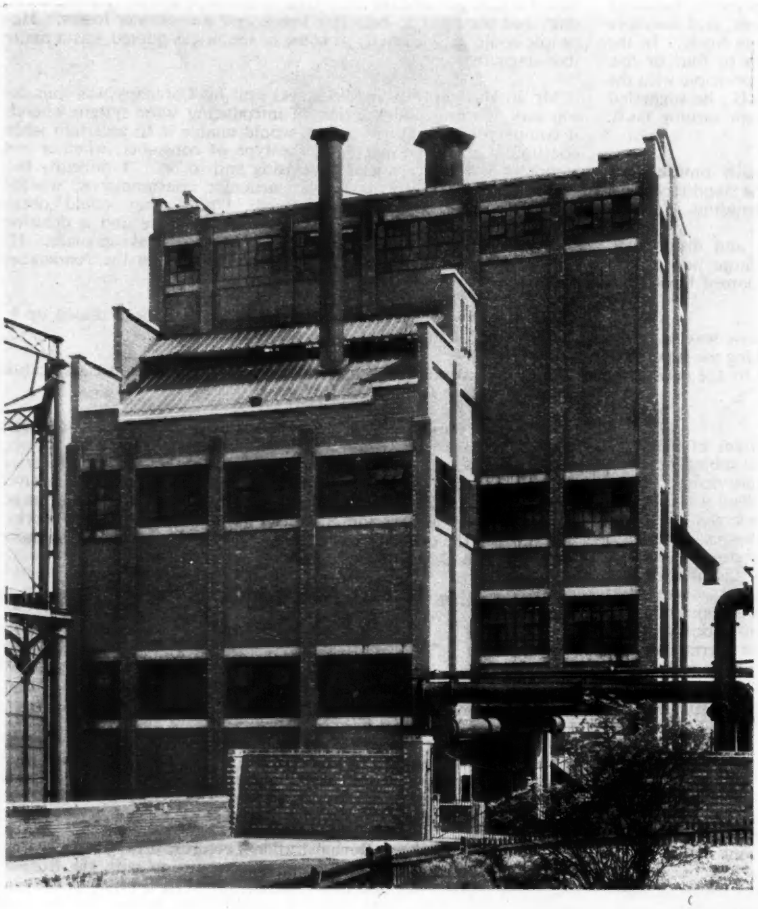
Members of the Institution of Gas Engineers are invited to attend a meeting of the Institute of Fuel, at the Institution of Mechanical Engineers, Storey's Gate, S.W. 1, on Feb. 18, at 6 p.m., when a Paper on "Individual and District Heating Systems" will be presented by Mr. Donald V. H. Smith.

New plant at the works of the March Gas and Coke Company is being constructed as speedily as possible, and it is hoped that it will be in production by the early spring. For some time the existing plant has not been able to provide sufficient pressure of gas to consumers.

Members of the Institution of Gas Engineers will be welcome at a joint meeting of the Chemical Engineering Group and the Institution of Chemical Engineers on Feb. 19 at 5.30 p.m. at Burlington House, Piccadilly, when a Paper entitled "The Preparation of Clean Coal for Special Purposes" will be presented by Dr. E. T. Wilkins (Fuel Research Station).

The X-ray Analysis Group of the Institute of Physics announces that its 1946 Conference will take place at the Royal Institution, London, on July 9, 10 and 11, and is open to all without charge. It is hoped that several distinguished foreign scientists will participate in the proceedings. Accommodation in London is very limited, and those proposing to attend the Conference are advised to make reservation immediately.

The Handbook for Electric Welders published by Murex Welding Processes, Ltd., which has been through eight editions, has now been completely revised. The new 185-page edition (5s.) contains a wealth of information on all phases of welding, and should be of value to the student, operator, supervisor and designer. The welding of brasses with a bronze electrode and the use of Bronalex, a new electrode for the welding of high tensile aluminium-bronzes, are dealt with in an entirely new chapter. The sections dealing with the application of welding to cast iron, stainless steels, copper, bronze, brass, and aluminium have been revised, and the chapter devoted to the strength of welded joints has received particular attention. The handbook contains comprehensive appendices and a useful bibliography.



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ARCHITECTURAL FEATURES

From the layman's point of view, perhaps the most interesting feature is the attempt to produce in an essentially industrial building a pleasing architectural appearance. The steel frame-work of the building has been encased in brickwork, and the coal-receiving annexe and coke hoppers are built as integral features of the main building. A liberal use has been made of steel-framed windows for producing maximum natural lighting and ventilation. Parapets with "Snowcrete" coping form a pleasing finish to the skyline. Rain-water pipes are not visible, being taken down internally. The full effect of the building when viewed from Desborough Road is masked to some extent by the abutment of the old horizontal retort house, but when this is dismantled and the new retort house extended it will appear as an independent and symmetrically designed structure.

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GAS PRODUCTS PRICES

The London Market Feb. 4.

There are no changes to report in the prices of Coal Tar Products since our report dated Dec. 28.

Maximum prices fixed by S. R. & O. 1945, 1572, are as follows:—

Coal tar naphtha from 1s. 11d. per gall. for the 90/200 (unrectified) grade to 2s. 11d. per gall. for the 96/160. Xylole: 3s. 3½d. to 3s. 6d. per gall. according to grade. The naphtha and xylole prices are for 1,000 gall. lots delivered buyer's address in bulk. Toluole 2s. 4d. to 3s. 2¼d. per gall. *ex* works in bulk in 1,000 gall. lots.

Under S. R. & O. 1943, 1528, prices for cresylic acid range from 3s. 6d. per gall. for refined acid D grade to 5s. per gall. for acid containing 52/53% metacresol. Phenol (carbolic acid crystals) 9½d. to 11½d. per lb. Creosote for timber preservation 5½d.; benzole absorbing oil 6½d. to 8d.; creosote for disinfection making 10d. to 1s. 7d. per gall.; all *ex* seller's works in bulk for minimum 800 gall. lots.

Naphthalene prices are controlled by S. R. & O. 1944, 1051.

Road tar 5½d. per gall. in buyer's tanks at seller's works. Coal tar pitch for briquette-making, 70s. per ton.

For such quantities of products as are available for export and for which licences can be obtained, higher prices can be realized.

The Provinces Feb. 4.

The average prices of gas-works products during the week were: Pitch, 70s. per ton; toluole, naked, North, 90's, 2s. 4d. to 2s. 6¾d. per gallon; pure, 3s. 2¼d. Prices for carbolic acid 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil are controlled by S. R. & O. 1943, 1538, and for naphthalene by S. R. & O. 1944, 1051. Prices for road tar were increased by a half-penny per gallon by S. R. & O. 1945, 229, under which Order there was also an increase of 5s. per ton in the price for standard creosote-pitch mixture.

The bulk of the pitch produced in this country is required for home trade purposes, but certain quantities are being sent at higher prices to Allied countries with the approval of the Coal Tar Control. So far as creosote is concerned the bulk is required for essential purposes, at controlled prices. With regard to hydrocarbon oils, the prices remain fixed, although there is more freedom than was previously the case.

Scotland Feb. 2.

Demand exceeds production and prices continue firm. Refined tar*: Yield to Distillers is 5d. per gallon *ex* Works, naked. Cerosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7¼d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 7d. to 8d. per gallon. Solvent naphtha*: Basic maximum prices delivered in bulk, 90/160 grade, 2s. 10d., and 90/190 Heavy naphtha, Unrectified, 2s. 0½d.; Rectified, 2s. 4d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

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